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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/753,666	01/04/2001	Kazutoshi Takayama	0994-0206P	1904

7590 11/04/2003

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EXAMINER	
LUK, EMMANUEL S	

ART UNIT	PAPER NUMBER
1722	

DATE MAILED: 11/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/753,666	TAKAYAMA ET AL.	
	Examiner	Art Unit	
	Emmanuel S. Luk	1722	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 August 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7 and 9-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7 and 9-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1-3, 5, 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsui in view of Bacchi.

Matsui teaches the claimed product removal apparatus for an injection molding machine (Col. 1, lines 62-67) having a rotation drive unit (31) disposed on a support base (2), a first arm (3) having a proximal end portion fixed to a rotary shaft (34) of the rotation drive unit, a first proximal-side pulley (25) disposed coxially with the rotary shaft and fixed to the support base, a second proximal-side pulley (36) fixed to distal end portion of the first arm, an intermediate shaft (15) rotatably supported on the distal end portion of the first arm, the intermediate shaft penetrating a center portion of the second proximal-side pulley, a first distal-side pulley (12) provided integrally with the

intermediate shaft, a first rotation transmission section connecting the first distal-side pulley and the first-proximal side pulley, a second arm (5), distal-side shaft (62) rotatably supported on a distal end portion of the second arm, a second distal-side pulley (63) provided integrally with the distal-side shaft, a second rotation transmission section for connecting the second distal-side pulley and the second proximal-side pulley and a chuck (7), the first and second arms and chuck rotates so that the chuck assumes a constant orientation. The chuck moves between the guide bars (72a-d). The support frame (44f) is fixed to the top surface of the stationary platen (71), the support frame supports a support base (44b) that can be adjusted freely (Col. 4, lines 57-66).

Matsui fails to teach the tooth-number ratio between the pulleys and the second arm is substantially entirely overlapped between a movable mold and a stationary mold of the production machine.

Bacchi teaches a robot having rotational drive units (50, 52 and 92) disposed in a base housing (13), a first arm (12) with a proximal end portion of the first arm fixed to the rotary shaft (53, 70), a first proximal-side pulley (54, 72) disposed coaxially with the immediate shaft (53, 70), a second distal pulley (56, 76) fixed to a distal end portion of the first arm, an intermediate shaft (57) rotatably supported on the distal end portion of the first arm, the intermediate shaft penetrating a center portion of the second proximal-side pulley (56, 76), a first distal-side pulley (58) provided integrally with the immediate shaft, a first rotation transmission section for drivingly connecting the first distal-side pulley an the first proximal-side pulley, a second arm (15) with a proximal end portion of the second arm fixed to the intermediate shaft, a distal-side shaft rotatably supported on

a distal end portion of the second arm, a second distal-side pulley provided integrally with the distal-side shaft, a second rotation transmission section for drivingly connecting the second distal side pulley with the second proximal-side pulley.

In regards to claims 2 and 3 concerning the tooth-number ratio, the variables 'm' and 'n' are broadly interpreted as any number including m=n, m=1 and/or n=1. Additionally, Bacchi teaches the ratio of the diameters of hand drive pulley (66) and hand pulley (86) is 1:2, thus it would have been obvious to one of ordinary skill in the art to recognize that the tooth-number ratio between the two pulleys are 1:n because as described by the applicants (p. 14) the term "tooth number" is used in relation to pulley encompasses a circumferential length of each pulley. The remaining pulleys taught by Bacchi are not specifically taught a tooth-number ratio and can have different ratios including 1:1. It would have been obvious to one of ordinary skill in the art to modify the pulleys of Bacchi for the desired tooth-number ratios between respective pulleys because it allows for controlled movement of the angular displacement of the arms in respect to the pulleys.

In regards claim 5, the chuck moving between the upper and lower guide bars, Matsui teaches the chuck moving between the two upper guide bars. However, Bacchi teaches the robotic arm in the horizontal direction. It is merely the positioning of the arm in relation to the injection machine of where it would go between to retrieve the articles. One of ordinary skill in the art would recognize the different positions of the arms would be merely a rearrangement of the machine parts without changing the function of the arms.

In regards to claims 14 and 15, as the chuck faces the product, the arms must extend downward to be able to remove the product, the arms can be considered to be almost vertical in direction. It is merely a difference in placement that would allow for the arms to extend in a completely vertical direction. In regards to claim 15, the arms and chuck are capable in orienting the desired movement. It would have been obvious to one of ordinary skill in the art to modify the position and control of the arms to move in the desired motions via the control system (Col. 6, lines 7-12).

In regards to the rotational angles of the arms, Matsui teaches a similar arm and chuck structure that maintains the chuck in constant orientation during the operations regardless of the rotational angles. It would have been obvious to one of ordinary skill in the art to apply any angle limitations to the arms that would maintain the constant orientation of the chuck.

In regards to the second arm being "substantially entirely overlapped" by the molds, there is confusion concerning this phrase. It shall be interpreted that the second arm extends in between the molds in its entirety. In regards to the second arm extending between the molds, Matsui teaches the arms extending into molds to the center of the molds for the chucks to remove the product. It is a matter of arm length that affects what is extended into the molds and it would have been obvious to one of ordinary skill in the art to change the size of the second arm so that it is maneuvered between the molds so that it is overlapped because this is a choice of design with the change in size of the second arm. In re Rose, 105 USPQ 237 (CCPA 1955).

It would have obvious to one of ordinary skill in the art to modify Matsui with the tooth-number ratio as taught by Bacchi because it allows for controlled movement of the arms during operations.

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsui in view of Bacchi as applied to claims 1-3, 5-7, 14 and 15 above, and further in view of Hashimoto et al.

Matsui fails to specifically teach the distance between the center of the second proximal-side pulley and the center of the second distal-side pulley is set to the distance between the center of the first proximal-side pulley and the center of the first distal-side pulley.

However, Hashimoto teaches the ratio of the distance (L1) between the center point of the pulley portion (16c) of the second output shaft member (16) and that of the basal pulley portion (82a) of the second arm (82) to the distance (L2) between the center point of the basal pulley portion (82a) of the second arm (82) and that of the pulley portion (83a) of the hand (83) is 1 to 1. In this case, Hashimoto relates to a transmission gear for transmitting two rotary motions from a driving mechanism to a working mechanism and relates to the driving of rotational arms connected at points that are driven by pulleys. Thus, it would have been obvious to one of ordinary skill in the art to recognize Hashimoto as being related to the driving mechanism of the robot arm taught by Bacchi.

It would have been obvious to one of ordinary skill in the art to modify Matsui with having the distance between the center of the respective pulleys to have the same distance as taught by Hashimoto because it allows for the desired length or the robot arm to reach for extracting the product.

5. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsui in view of Bacchi as applied to claims 1-3, 5, 14 and 15 above, and further in view of Brenholdt.

Matsui fails to teach a support base supported by a movement mechanism or rotation mechanism.

Matsui already teaches the robotic arms located on the upper end of the injection molding machine. The rotational base of the robotic arm is taught by Brenholt with the robot (10) having an articulated arm assembly (12) pivoted to a turntable assembly (14) for rotation on a base assembly. This allows for a total of five axes of motion (Col. 2, lines 13-17).

It would have obvious to one of ordinary skill in the art to modify Matsui with a rotational base as taught by Brenholt because it allows for additional axes of motion to the robotic arm.

6. Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsui in view of Bacchi and Hashimoto.

Matsui teaches the claimed product removal apparatus for an injection molding machine (Col. 1, lines 62-67) having a rotation drive unit (31) disposed on a support base (2), a first arm (3) having a proximal end portion fixed to a rotary shaft (34) of the rotation drive unit, a first proximal-side pulley (25) disposed coxially with the rotary shaft and fixed to the support base, a second proximal-side pulley (36) fixed to distal end portion of the first arm, an intermediate shaft (15) rotatably supported on the distal end portion of the first arm, the intermediate shaft penetrating a center portion of the second proximal-side pulley, a first distal-side pulley (12) provided integrally with the intermediate shaft, a first rotation transmission section connecting the first distal-side pulley and the first-proximal side pulley, a second arm (5), distal-side shaft (62) rotatably supported on a distal end portion of the second arm, a second distal-side pulley (63) provided integrally with the distal-side shaft, a second rotation transmission section for connecting the second distal-side pulley and the second proximal-side pulley and a chuck (7), the first and second arms and chuck rotates so that the chuck assumes a constant orientation. The chuck moves between the guide bars (72a-d). The support frame (44f) is fixed to the top surface of the stationary platen (71), the support frame supports a support base (44b) that can be adjusted freely (Col. 4, lines 57-66).

Matsui fails to teach a tooth-number ratio between the connected pulleys, the distance between the center of the second proximal-side pulley, the center of the second distal-side pulley is set to the distance between the center of the first proximal-side pulley and the center of the first distal-side pulley and the second arm is

substantially entirely overlapped between a movable mold and a stationary mold of the production machine.

Bacchi teaches a robot having rotational drive units (50, 52 and 92) disposed in a base housing (13), a first arm (12) with a proximal end portion of the first arm fixed to the rotary shaft (53, 70), a first proximal-side pulley (54, 72) disposed coaxially with the immediate shaft (53, 70), a second distal pulley (56, 76) fixed to a distal end portion of the first arm, an intermediate shaft (57) rotatably supported on the distal end portion of the first arm, the intermediate shaft penetrating a center portion of the second proximal-side pulley (56, 76), a first distal-side pulley (58) provided integrally with the immediate shaft, a first rotation transmission section for drivingly connecting the first distal-side pulley an the first proximal-side pulley, a second arm (15) with a proximal end portion of the second arm fixed to the intermediate shaft, a distal-side shaft rotatably supported on a distal end portion of the second arm, a second distal-side pulley provided integrally with the distal-side shaft, a second rotation transmission section for drivingly connecting the second distal side pulley with the second proximal-side pulley.

In regards to claims 10 and 11 concerning the tooth-number ratio, the variables 'm' and 'n' are broadly interpreted as any number including m=n, m=1 and/or n=1. Additionally, Bacchi teaches the ratio of the diameters of hand drive pulley (66) and hand pulley (86) is 1:2, thus it would have been obvious to one of ordinary skill in the art to recognize that the tooth-number ratio between the two pulleys are 1:n because as described by the applicants (p. 14) the term "tooth number" is used in relation to pulley encompasses a circumferential length of each pulley. The remaining pulleys taught by

Bacchi are not specifically taught a tooth-number ratio and can have different ratios including 1:1. It would have been obvious to one of ordinary skill in the art to modify the pulleys of Bacchi for the desired tooth-number ratios between respective pulleys because it allows for controlled movement of the angular displacement of the arms in respect to the pulleys.

Hashimoto teaches the ratio of the distance (L1) between the center point of the pulley portion (16c) of the second output shaft member (16) and that of the basal pulley portion (82a) of the second arm (82) to the distance (L2) between the center point of the basal pulley portion (82a) of the second arm (82) and that of the pulley portion (83a) of the hand (83) is 1 to 1. In this case, Hashimoto relates to a transmission gear for transmitting two rotary motions from a driving mechanism to a working mechanism and relates to the driving of rotational arms connected at points that are driven by pulleys. Thus, it would have been obvious to one of ordinary skill in the art to recognize Hashimoto as being related to the driving mechanism of the robot arm taught by Bacchi.

In regards claim 5, the chuck moving between the upper and lower guide bars, Matsui teaches the chuck moving between the two upper guide bars. However, Bacchi teaches the robotic arm in the horizontal direction. It is merely the positioning of the arm in relation to the injection machine of where it would go between to retrieve the articles. One of ordinary skill in the art would recognize the different positions of the arms would be merely a rearrangement of the machine parts without changing the function of the arms.

In regards to the rotational angles of the arms, Matsui teaches a similar arm and chuck structure that maintains the chuck in constant orientation during the operations regardless of the rotational angles. It would have been obvious to one of ordinary skill in the art to apply any angle limitations to the arms that would maintain the constant orientation of the chuck.

In regards to the second arm being "substantially entirely overlapped" by the molds, there is confusion concerning this phrase. It shall be interpreted that the second arm extends in between the molds in its entirety. In regards to the second arm extending between the molds, Matsui teaches the arms extending into molds to the center of the molds for the chucks to remove the product. It is a matter of arm length that affects what is extended into the molds and it would have been obvious to one of ordinary skill in the art to change the size of the second arm so that it is maneuvered between the molds so that it is overlapped because this is a choice of design with the change in size of the second arm. In re Rose, 105 USPQ 237 (CCPA 1955).

It would have obvious to one of ordinary skill in the art to modify Matsui with the tooth-number ratio as taught by Bacchi because it allows for controlled movement of the arms during operations and having the distance between the center of the respective pulleys to have the same distance as taught by Hashimoto because it allows for the desired length or the robot arm to reach for extracting the product.

7. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsui in view of Bacchi and Hashimoto as applied to claims 9-11 above, and further in view of Brenholdt.

Matsui fails to teach a support base supported by a movement mechanism or rotation mechanism.

Matsui already teaches the robotic arms located on the upper end of the injection molding machine. The rotational base of the robotic arm is taught by Brenholt with the robot (10) having an articulated arm assembly (12) pivoted to a turntable assembly (14) for rotation on a base assembly. This allows for a total of five axes of motion (Col. 2, lines 13-17).

It would have obvious to one of ordinary skill in the art to modify Matsui with a rotational base as taught by Brenholt because it allows for additional axes of motion to the robotic arm.

8. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsui in view of Bacchi and Brenholt et al.

Matsui teaches the claimed product removal apparatus for an injection molding machine (Col. 1, lines 62-67) having a rotation drive unit (31) disposed on a support base (2), a first arm (3) having a proximal end portion fixed to a rotary shaft (34) of the rotation drive unit, a first proximal-side pulley (25) disposed coaxially with the rotary shaft and fixed to the support base, a second proximal-side pulley (36) fixed to distal end portion of the first arm, an intermediate shaft (15) rotatably supported on the distal

end portion of the first arm, the intermediate shaft penetrating a center portion of the second proximal-side pulley, a first distal-side pulley (12) provided integrally with the intermediate shaft, a first rotation transmission section connecting the first distal-side pulley and the first-proximal side pulley, a second arm (5), distal-side shaft (62) rotatably supported on a distal end portion of the second arm, a second distal-side pulley (63) provided integrally with the distal-side shaft, a second rotation transmission section for connecting the second distal-side pulley and the second proximal-side pulley and a chuck (7), the first and second arms and chuck rotates so that the chuck assumes a constant orientation. The chuck moves between the guide bars (72a-d). The support frame (44f) is fixed to the top surface of the stationary platen (71), the support frame supports a support base (44b) that can be adjusted freely (Col. 4, lines 57-66).

Matsui fails to teach a tooth-number ratio between the connected pulleys, the chuck is moved through a space between the upper and lower tie bars and the rotation mechanism is located in a position above the tie bars of the injection molding machine.

Bacchi teaches a robot having rotational drive units (50, 52 and 92) disposed in a base housing (13), a first arm (12) with a proximal end portion of the first arm fixed to the rotary shaft (53, 70), a first proximal-side pulley (54, 72) disposed coaxially with the immediate shaft (53, 70), a second distal pulley (56, 76) fixed to a distal end portion of the first arm, an intermediate shaft (57) rotatably supported on the distal end portion of the first arm, the intermediate shaft penetrating a center portion of the second proximal-side pulley (56, 76), a first distal-side pulley (58) provided integrally with the immediate shaft, a first rotation transmission section for drivingly connecting the first distal-side

pulley an the first proximal-side pulley, a second arm (15) with a proximal end portion of the second arm fixed to the intermediate shaft, a distal-side shaft rotatably supported on a distal end portion of the second arm, a second distal-side pulley provided integrally with the distal-side shaft, a second rotation transmission section for drivingly connecting the second distal side pulley with the second proximal-side pulley.

In regards to the tooth-number ratio, the variables 'm' and 'n' are broadly interpreted as any number including m=n, m=1 and/or n=1. Additionally, Bacchi teaches the ratio of the diameters of hand drive pulley (66) and hand pulley (86) is 1:2, thus it would have been obvious to one of ordinary skill in the art to recognize that the tooth-number ratio between the two pulleys are 1:n because as described by the applicants (p. 14) the term "tooth number" is used in relation to pulley encompasses a circumferential length of each pulley. The remaining pulleys taught by Bacchi are not specifically taught a tooth-number ratio and can have different ratios including 1:1. It would have been obvious to one of ordinary skill in the art to modify the pulleys of Bacchi for the desired tooth-number ratios between respective pulleys because it allows for controlled movement of the angular displacement of the arms in respect to the pulleys.

In regards to the chuck moving between the upper and lower guide bars, Matsui teaches the chuck moving between the two upper guide bars. However, Bacchi teaches the robotic arm in the horizontal direction. It is merely the positioning of the arm in relation to the injection machine of where it would go between to retrieve the articles. One of ordinary skill in the art would recognize the different positions of the

arms would be merely a rearrangement of the machine parts without changing the function of the arms.

In regards to the rotational angles of the arms, Matsui teaches a similar arm and chuck structure that maintains the chuck in constant orientation during the operations regardless of the rotational angles. It would have been obvious to one of ordinary skill in the art to apply any angle limitations to the arms that would maintain the constant orientation of the chuck.

Matsui already teaches the robotic arms located on the upper end of the injection molding machine. The rotational base of the robotic arm is taught by Brenholt with the robot (10) having an articulated arm assembly (12) pivoted to a turntable assembly (14) for rotation on a base assembly. This allows for a total of five axes of motion (Col. 2, lines 13-17).

It would have obvious to one of ordinary skill in the art to modify Matsui with the tooth-number ratio as taught by Bacchi because it allows for controlled movement of the arms during operations and a rotational base as taught by Brenholt because it allows for additional axes of motion to the robotic arm.

Response to Arguments

9. Applicant's arguments with respect to claims 1-13 have been considered but are moot in view of the new ground(s) of rejection. The applicants have amended the claims to include the second arm being substantially entirely overlapped by the molds and also in claim 13, the rotation mechanism is located above the tie bars in the upper

end of the injection molding machine. It would have been obvious to modify Matsui to have the second arms extend into the molds and in claim 13, the rotational base is taught by Brenholt.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Emmanuel S. Luk whose telephone number is (703) 305-1558. The examiner can normally be reached on Monday through Friday 8 to 4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L. Walker can be reached on (703) 308-0457. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0651.

E.L.

Joseph Drodge
JOSEPH DRODGE
PRIMARY EXAMINER